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ABSTRACT

Unobtrusive measures in psychological experiments are discussed. Six levels of unobtrusiveness are (1) Complete Unobtrusiveness, (2) Hidden Mechanical Intervention, (3) Hidden Observer, (4) Impinging Mechanical Intervention Not Recognized as Experimental, (5) Impinging Observer, and (6) Unobtrusive Measures within an Experimental Setting. Each of these levels is discussed. Distinguishing levels of obtrusiveness has merit only to the extent it allows identification of potential sources of reactivity. The two main advantages of unobtrusive measures are that they avoid many of the potential artifacts of lab experiments and that they increase the range of testable variables. The extent, by unobtrusive measures are: subject awareness, experimental arrangements, and limited method variance. The disadvantages of unobtrusive measures are decreased internal validity, inability to test many hypotheses, high dross or low saturation, which may be associated with a high cost of experimentation, possible invasion of privacy, and introduction of observer errors. Cooperation and competition could be studied in numerous ways by unobtrusive measures; examples are given as illustrations of these ways. (DB)

UNOBTRUSIVE MEASURES

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UNOBTRUSIVE MEASURES

Webb, et. al. (1966, p.2) indicate that unobtrusive measures are those which "do not require the cooperation of a respondent and that do not themselves contaminate the response." There are several difficulties and deficiencies in Webb's definition. One petty difficulty is that 'cooperation of respondents' and 'contamination of responses' are partially independent criterion constructs and Webb does not clearly indicate whether unobtrusive measures need satisfy both or only one of these criteria.

A more serious difficulty is that 'cooperation of respondents' and 'contamination of responses' are not clearly defined constructs. In one sense there is no such thing as a non-contaminated response; the mere choice of a measuring instrument introduced one kind of contamination. There are few psychological variables independent of their measurement. The notion of a non-contaminated response assumes that psychological constructs are analogous to physical entities which may be more or less accurately measured. But competition or conformity have no size or weight comparable to a table. People display one kind of competitive behavior on the freeways and another in a psychological experiment. There is no "competitiveness" independent of some measurement situation; what psychologists mean by "competitiveness" is some set of observations in some set of measurement situations. To argue that one set of situations measures "true competitiveness" is to regress from psychological experimentation to philosophical word games. Webb, et. al., reject operational definitionism as myopic and sterile and suggest that truth can be approached only by method variance. They assume that each method contains some amount of error and that triangulation by means of a multi-method approach allows us to zero in on the truth. In many areas of psychology, however, there is no one truth onto which we can triangulate. Persons do not contain a certain amount of competitiveness which is underestimated by interviews and overestimated by analysis of freeway driving behavior. Rather, persons

simply have interview taking behavior and freeway driving behavior. In such a world, operational definitionism must be appreciated as necessary and method variance must be welcomed not because it will allow us to zero in on the truth but rather because it allows us to test the limits and generality of our concepts.

Perhaps the greatest deficiency in Webb's conception of unobtrusive measures is that measures are not easily classified as unobtrusive or not. Six levels of unobtrusiveness may be distinguished, as follows:

Level One: Complete Unobtrusiveness. For a measure to be completely unobtrusive there must be no conceivable way the measure could react with the behavior under scrutiny. Usually complete unobtrusiveness can be obtained only if the scientist completely abstains from intervening in any way in the setting studied. For completely unobtrusive data the scientist would have to depend on traces and archives. Traces and archives are of only limited utility, however, because they are only occasionally available and are subject to errors due to misinterpretation, and original observer biases. Further, a high dross rate makes this data uneconomical.

Level Two: Hidden Mechanical Intervention. If the scientist in any way impinges on the environment which he wishes to study, he runs the risk of some form of reactivity. Even the least obtrusive mechanical intervention into the setting studied may in some way affect the data obtained. For example, consider the scientist who installs a completely invisible and soundless T.V camera behind a one-way mirror in a shoe store because he is interested in the relation of facial expressions and buying behavior. This appears to be a completely unobtrusive measure, but the mere fact of the physical intervention into the setting makes some reactivity conceivable. For example, if only the store manager knew of the T.V camera, the manager may react to the knowledge of the camera by assuming a different posture with his salesmen who in turn may assume a different attitude toward their potential buyers who in turn may assume a different expression before the T.V. camera.

Level Three: Hidden Observer: If the scientist introduces a person behind the one-way mirror, the potential for a different type of reactivity is added. The person may in some way communicate an attitude to the manager so that the direction of reactivity may be partially determined by the observer. As the obscure observer becomes less obscure (e.g. standing supposedly unnoticed on a street corner) the extent and direction of reactivity become potentially more determined by the observer.

Level Four: Impinging Mechanical Intervention Not Recognized as Experimental. In order to cut down on dross rate and to provide a controlable independent variable, experimenters often place a stimulus into a setting in order to test the reaction of persons to that setting. For example, to study the incidence of thievery, experimenters have abandoned cars in city streets. Although persons may not recognize these mechanical interventions as experimental, there nevertheless exist two potential forms of reactivity. First, the way in which the experimenters leave the impinging object may partially determine subjects' reactions. For example, a car left in the middle of the night, parked at an angle and far from the curb with its wheels facing out and its antenna up may receive different treatment than one more cautiously parked. The type of object left is the second potential source of reactivity. The car's age, color, make, model, and recency of registration may all affect thieves. Variance in nature of the impinging object and the way in which it is placed assume added importance because they may be the mode through which experimenter bias expresses itself. For conscious and unconscious reasons an experimenter may choose and place an object in such a way as to get reactions which support some hypothesis.

Level Five: Impinging Observer. If a person rather than physical object is placed in the experimental setting in order to obtain subjects' reactions, the probability of reactivity is increased to the extent that the person can communicate. Communication can occur even if the confederate is placed in the setting as an object.

For example, if a person plays unconscious on a subway station floor in order to test a hypothesis about passerby reactions to distress, the confederate's body position, rate of breathing, and facial expression, may all communicate cues which invite approach or avoidance in passerbys. As in the case of the abandoned car, the experimenter's choice of a person with a certain combination of height, build, attractiveness, sex, age, race, and clothing may reflect conscious or unconscious experimenter bias. Thus contaminated responses can be obtained from naive subjects. Further, as interaction between subject and stimulus object is increased, the possibility of reactivity increases. If for example the stimulus person is soliciting money rather than playing dead, the potential for influencing subject response multiplies.

Level Six: Unobtrusive Measures Within an Experimental Setting. Deception experiments are usually conducted on the premise that if subjects do not know that a certain reaction is being measured, that reaction will more probably reflect their everyday response rather than some experimental subject role. This premise is reasonable to the extent that experimental subjects assume roles limited to the reactions they believe are being measured. If all of the reactions of a subject in an experimental setting are influenced by the subject's knowledge that he is in an experiment, however, then most deception experiments are a waste of time and nonreactive measures are not possible within psychology labs.

Distinguishing levels of obtrusiveness has merit only to the extent it allows identification of potential sources of reactivity. The validity of a psychological experiment is not a simple function of the unobtrusiveness of its measures. In some instances the most obtrusive measure may produce the most valid results. For example, the most obtrusive measures might yield the most valid measures of the effect of fear on GSR and breath rate. Psychological realism in some respects can compensate for obtrusive measures. Subject

variables also may effect the validity of obtrusive measures. For example, very obvious recording devices may produce valid measures on children or very unsophisticated subjects.

Unobtrusive measures as a class suffer from advantages and disadvantages when compared to more classical obtrusive measures. Oddball studies as a group probably contain more plausible rival hypotheses than interviews or lab experiments. It is the combination of unobtrusive and obtrusive measures which offers potential for advancing psychological inquiry. Multioperationalism is necessary to validate any construct. Only by method variance can we determine if any one result is a limited product of a measurement method or a reflection of a more general characteristic of the world.

Advantages of Unobtrusive Measures

The two main advantages of unobtrusive measures are that they avoid many of the potential artifacts of lab experiments and increase the range of testable variables. There are three type of artifacts of lab experiments which are avoided to at least some extent by unobtrusive measures: subject awareness, experimental arrangements, and limited method variance.

Avoiding Subject Awareness. Subjects who know they are subjects of a psychological experiment may not react in ways representative of naive subjects and so may destroy the external validity of lab experiments. The problems presented by subject awareness have been discussed and researched rather extensively under several labels: evaluation apprehension, suspicion and response involvement. These problems are usually entirely avoided by unobtrusive measures. Suspiciousness of the subject may affect the results of an experiment using unobtrusive measures, but the results maintain their external validity because the suspiciousness measured is representative of the suspiciousness occurring in the world and is not created by the experiment.

Avoiding Reactive Experimental Arrangements. Experimental props may not represent the arrangements of props in the world and so may destroy the external validity of lab experiments. The presence of the experimenter himself may be seen as a prop which may not be representative of the world. A number of problems associated with experimental arrangements have been discussed and researched extensively (e.g. : experimenter effects, experimenter bias, demand characteristics, interpersonal expectations, pretest sensitization, and unrepresentativeness of volunteers). To the extent that unobtrusive measures do not introduce an experimenter or manipulate subjects or their environment, they avoid most of the methodological problems of experimental arrangements. As previously noted, however, unobtrusive measures may introduce analogous problems by selection of dependent variables, subjects, props, and experimental setting.

Increasing Method Variance. Verbal reports may not represent behavior and behavior in one situation may not represent behavior in another. The limits of our knowledge may be tested only by method variance. Exclusive reliance on lab experiments reduces our opportunities for method variance. Unobtrusive measures allow us to test our hypotheses in the real world and avoid any artifacts which may be common to all lab experiments.

Increasing the Range of Testable Variables. Lab experiments cannot conveniently test hypotheses concerning large crowd behavior; sidewalk behavior; playground behavior; traffic behavior; or reaction of formed political, religious, or social groups. Unobtrusive measures extend our ability to test causal hypotheses to the world beyond the psychology lab. Unobtrusive measures allow the study of more directly socially relevant variables than do lab experiments; they may decrease the cost of or make possible otherwise too costly experiments. They may avoid deception and increase psychological realism.

Disadvantages of Unobtrusive Measures

Although unobtrusive measures tend to have increased external validity in comparison with lab experiments, they pay the price of decreased internal validity.

Whereas unobtrusive measures have a greater ability to test broad hypotheses, they have a lesser ability to test mini-hypotheses. Although unobtrusive measures often avoid deception, they often introduce invasion of privacy.

Decreased Internal Validity. Unobtrusive measures must rely to a large extent on the way the world is, and so often cannot measure exactly what is desired. Often the independent variable in an unobtrusive measure experiment is unanalytical so that it presents no clear discriminative stimuli and the results of the experiment remain causally ambiguous. Any confound found in natural settings can seldom be controlled by exclusive reliance on unobtrusive measures. To the extent that unobtrusive measures do not allow introduction, removal, and reintroduction of a specific independent variable, they tend to produce correlational type data.

Inability to Test Many Hypotheses. Naturally occurring confounds often cannot be broken apart by exclusive use of unobtrusive measures. Further, unobtrusive measures are usually unsuitable for testing most hypotheses which depend on subject report or physiological measures. Seldom is it possible to wire a subject for GSR or conduct an intensive interview without the subject knowing he is in a psychological experiment. Cultural comparisons are also often difficult. For example, we may study the effect of radio discussions on book withdrawals within a culture, but library structures, radio consumption, popularity of reading, and many other important variables vary across cultures so that it is difficult to determine the cause of the identified difference.

Other Disadvantages. Three other disadvantages which often occur with the use of unobtrusive measures are 1) high dross or low saturation, which may be associated with a high cost of experimentation, 2) possible invasion of privacy, and 3) introduction of observer errors. Campbell (1959) documents 21 types of human observer errors.

Unobtrusive Measures of Cooperation and Competition.

A number of studies have employed unobtrusive measures, to study cooperation and competition One of the earliest such experiments was described by Washburn (1928). Washburn and his wife traveled in rural Russia to a school "far enough out so that horses shied violently at the strange sight of a motorcar." There they found a school teacher who was unobtrusively observing whether her children preferred to farm a group or individual plot of ground. Hartshorne, May & Maller (1929) contrived unobtrusive observation situations to study, among other things, helpfulness and students' preference for group or individual reward. Deutsch (1949) considers preference for group over individual reward as the defining characteristic of cooperativeness. Other studies have used unobtrusive measures to study cooperation-competition-related benaviors. For example, Allen Funt has filmed cross-cultural differences in reaction to requests from a female confederate to carry a very heavy suitcase. "The Frenchman shrugged; the Englishman kept at it." (Webb, et al. 1966, p. 156). Doob & Gross (1968) have found that older cars stopped at a green light receive more honks. Other studies might be designed to test the generality of this relation between status and competition.

Cooperation and competition could be studied in numerous ways by unobtrusive measures. Some examples follow: Completely unobtrusive measures of competitiveness could be made in several ways. The themes of children's classroom readers might be analyzed for competitiveness in ways analogous to those employed by McClelland (1961) to study achievement. Competitiveness in letters might similarly be studied. If high competitors and low competitors are separated, it might be found that a variety of characteristics distinguish them. For example, it might be found that high competitors produce different kinds of doodles than low competitors. If so, the competitiveness of persons and situations might be assessed unobtrusively by analysis of the kinds of doodles left by those persons or in those situations. (See Aronson, 1958; Berger, 1954).

Hidden mechanical intervention might produce another class of data related to competitiveness. For example tape recorders might be hidden in certain situations, and language produced in those situations might be analyzed for competitive content. Conversations could be rated in terms of frequency of contradictions (competition) versus agreements (cooperation)

Hidden human observers could assess classroom and work situations for frequency of group versus individual reward. Traffic behavior could be analyzed (e g. How often do people make room for a lane changer - as a function of age of car, area of town, etc.). Structured and spontaneous playground play could be analyzed for cooperative and competitive structure and behaviors.

Impinging mechanical devices and humans could be used also in the study of cooperation. How often are lost letters returned in different settings? What is the reaction of persons to a request for help, an insult? - as a function of setting, confederate characteristics, and subject characteristics.

Within the lab setting a number of unobtrusive measures can be used to study competitiveness. For example in a study of brainstorming, the experimenters might be interested not in the number of ideas produced, but rather how many times subjects build on the content of another idea (cooperation) as opposed to suggesting a different idea (competition). Family interactions could be analyzed for cooperativeness and competitiveness in problem solving situations.

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